Programming & Software Development Practicum

Primary Career Cluster:	Information Technology (IT)
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Course Code(s):	5908
Prerequisite(s):	*Algebra I* (0842, 3012) and *Programming & Logic II* (6099)
Credit:	1
Grade Level:	11-12
Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Information Technology courses.
Programs of Study and Sequence:	This is the capstone course in the *Programming & Software Development* program of study.
Aligned Student Organization(s):	Skills USA: whttp://www.tnskillsusa.com Brandon Hudson, (615) 532-2804, Brandon.Hudson@tn.gov Technology Student Association (TSA): http://www.tntsa.org Amanda Hodges, (615) 532-6270, Amanda.Hodges@tn.gov
Coordinating Work-Based Learning:	Teachers who hold an active WBL certificate may offer placement for credit when the requirements of the state board's WBL Framework and the Department's WBL Policy Guide are met. For information, visit http://tn.gov/education/cte/work_based_learning.shtml.
Available Student Industry Certifications:	See http://www.tn.gov/education/cte/InformationTechnology.shtml
Dual Credit or Dual Enrollment Opportunities:	There are no known dual credit/dual enrollment opportunities for this course. If interested in developing, reach out to a local postsecondary institution to establish an articulation agreement.
Teacher Endorsement(s):	037, 041, 055, 056, 057, 152, 153, 203, 204, 311, 434, 435, 436, 474, 475, 476, 595, 740, 742
Required Teacher Certifications/Training:	If students are assigned in work-based learning settings, teachers must attend WBL training and earn the WBL Certificate provided by the Tennessee Department of Education.
Teacher Resources:	http://www.tn.gov/education/cte/InformationTechnology.shtml

Approved January 30, 2015

Course Description

Programming & Software Development Practicum is a capstone course intended to provide students with the opportunity to apply the skills and knowledge learned in previous *Programming & Software Development* courses toward the completion of an in-depth project with fellow team members. Students who have progressed to this level in the program of study take on more responsibilities for producing independent work and managing processes involved in the planning, designing, refinement, and production of original software applications. The course is designed to allow students to choose their specific application of interest, be it the development of a mobile application (app), an animation package, a game or other educational tool, or any other approved program that requires coding and development skills. Upon completion of the practicum, proficient students will be prepared for postsecondary study and career advancement in programming and software development, and will be equipped to market their finished product should they choose. Standards in this course are aligned with Tennessee State Standards for English Language Arts & Literacy in Technical Subjects and Tennessee State Standards in Mathematics.*****

Work-Based Learning Framework

Practicum activities may take the form of work-based learning (WBL) opportunities (such as internships, cooperative education, service learning, and job shadowing) or industry-driven project-based learning. These experiences must comply with the Work-Based Learning Framework guidelines established in SBE High School Policy 2.103. As such, this course must be taught by a teacher with an active WBL Certificate issued by the Tennessee Department of Education and follow policies outlined in the Work-Based Learning Policy Guide available online at http://www.tn.gov/education/cte/work_based_learning.shtml. The Tennessee Department of Education provides a *Personalized Learning Plan* template to ensure compliance with the Work-Based Learning Framework, state and federal Child Labor Law, and Tennessee Department of Education policies, which must be used for students participating in WBL opportunities.

Program of Study Application

This is the fourth course in the *Programming & Software Development* program of study. For more information on the benefits and requirements of implementing this program in full, please visit the Information Technology website at http://www.tn.gov/education/cte/InformationTechnology.shtml.

Course Standards

Programming & Software Development Career Planning

1) Research a company or organization that employs computer programmers or specializes in software design and development solutions. Companies could range from large software developers, to niche organizations that retain programmers on staff to serve their particular clients' needs. For the chosen company, cite specific textual evidence from the company's literature, as well as available press coverage (if available) to summarize:
    a. The mission and history of the organization
    b. Headquarters and organizational structure
    c. Products or services provided
    d. Credentials required for employment and how they are obtained and maintained
    e. Policies and procedures

       f.   Reports, newsletters, and other documents published by the organization
       g.   Website and contact information
(TN Reading 1, 2; TN Writing 7)

2) Analyze the requirements and qualifications for various programming and development job postings identified from specific company websites or online metasearch engines. Gather information from multiple sources, such as sample resumes, interviews with professionals, and job boards, to determine effective strategies for realizing career goals. Create a personal resume modeled after elements based on the findings above, then complete an authentic job application as part of a career search or work-based learning experience. (TN Reading 4, 9; TN Writing 4, 7, 8)

3) Participate in a mock interview. Prior to the interview, research tips on dress and grooming, most commonly asked interview questions, appropriate conduct during an interview, and recommended follow-up procedures. Upon completion of the interview, write a thank you letter to the interviewer in a written or email format. (TN Reading 2; TN Writing 2, 4, 7, 9)

Professional Ethics and Legal Responsibilities

4) Investigate current issues surrounding the use of software applications to collect and track user data. Explore a range of arguments concerning privacy rights as they relate to the mining of personal data; determine when it is ethical and legal to collect data for profit versus for security purposes. Advance an original argument that debates the pros and cons and summarizes the potential ramifications for clients, users, the public, and one's own personal reputation, drawing on evidence gathered from news media, company policies, and state and federal laws. (TN Reading 1, 2, 4, 8, 9; TN Writing 1, 4, 6, 7)

5) Research a case study involving an ethical issue related to intellectual property rights. Examine a variety of perspectives surrounding the issue, then develop an original analysis explaining the impact of the issue on those involved, using persuasive language and citing evidence from the research. Potential issues include copyright infringement, piracy, plagiarism, art licensing, creative commons, and the state/federal laws that govern them. (TN Reading 1, 2; TN Writing 1, 4, 6, 7)

Course Project

6) In teams or individually, develop a written proposal for an original program or software application that involves advanced refinement and transfer of skills and knowledge acquired in previous *Programming & Software Development* courses. The proposal should be narrative in nature but supplemented by relevant data and graphic illustrations as needed, such as flowcharts of development processes and diagrams or sketches of what the end product would resemble. Sample projects include: developing a mobile app; designing an animation package or plug-in; writing an original game program; or any other programming-based project. Present the proposal to the class, and continually revise based on feedback from peers. (TN Reading 3, 7, 9; TN Writing 4, 5, 6, 7)

7) Throughout the design and development process, develop supplementary documents, presentations, and strategies to support the production and promotion of the program, app, or

product. Identify the target market for the product, and devise a tentative plan to inform, promote, and convince prospective users of the product's functions and value. Research marketing plan templates and sample presentations, and synthesize information to produce an original plan outlining how the team intends to market the product once it is finished. (TN Reading 3, 7, 9; TN Writing 4, 5, 6, 7)

8) Apply coding skills learned in previous courses to novel contexts and development environments. For example, develop skills in an emerging technology that would support the completion of the course project, or learn a new programming language not previously studied in order to enhance the functionality of the product. (TN Writing 6, 7)

Advanced Troubleshooting, Critiquing, & Problem Solving

9) In the course of developing the project, regularly test for functionality, compatibility, and other design aspects related to user friendliness. Conduct and document the proper code validation to resolve errors encountered in the design process. (TN Reading 3, 8; TN Writing 6, 7)

10) Analyze the code written by another team member or peer and create a flowchart for suggesting changes to improve functionality. Cite specific examples in the code to support recommendations. (TN Reading 1, 2, 3, 4, 5, 6, 7, 8; TN Writing 1, 4, 6)

11) Research and test for potential security threats related to the intended uses of the app, program, or product. For example, if a mobile app is developed, determine the most common security threats and identify areas of vulnerability in the product that could be remedied by adjusting for the proper code, patching, or system update. If possible, develop and incorporate security measures into the final product to ensure user safety. (TN Reading 2, 4)

Portfolio

12) Create a portfolio, or similar collection of work, that illustrates mastery of skills and knowledge outlined in the previous courses and applied in the practicum. The portfolio should reflect thoughtful assessment and evaluation of the progression of work involving the application of steps of the design process, as outlined by the instructor. The following documents will reside in the student's portfolio:
     a. Personal code of ethics
     b. Career and professional development plan
     c. Resume
     d. Project proposal with supporting documents
     e. List of responsibilities undertaken through the course
     f. Examples of visual materials developed and used during the course (such as drawings, models, presentation slides, videos, and demonstrations)
     g. Marketing plan
     h. Description of technology used, with examples if appropriate
     i. Periodic journal entries reflecting on tasks and activities
     j. Feedback from instructor and/or supervisor based on observations
   (TN Reading 7; TN Writing 4, 5, 6)

Communication of Project Results

13) Produce technical reports highlighting the purpose, content, and use of the app, program, and product developed for this course. Cite evidence from multiple authoritative sources in order to justify design and development decisions and maximize the user experience. Incorporate supporting graphics, sketches, and data as needed to summarize the technical specifications of the product. (TN Reading 1, 2, 3, 4, 5, 7, 8, 9; TN Writing 1, 5, 6, 7, 8, 9)

14) Upon completion of the practicum, develop a technology-enhanced presentation showcasing highlights, challenges, and lessons learned from the experience. The presentation should be delivered orally, but supported by relevant graphic illustrations, such as diagrams, flowcharts, and/or market data on the target users. Prepare the presentation in a format that could be presented to both a technical and a non-technical audience, as well as for a career and technical student organization (CTSO) competitive event. (TN Reading 1, 3, 7, 9; TN Writing 2, 4, 5, 6, 9)

Standards Alignment Notes

*References to other standards include:
- TN Reading: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Reading Standards for Literacy in Science and Technical Subjects 6-12; Grades 11-12 Students (page 62).
  - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standard 10 at the conclusion of the course.
- TN Writing: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12; Grades 11-12 Students (pages 64-66).
  - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standards 3 and 10 at the conclusion of the course.
- P21: Partnership for 21st Century Skills Framework for 21st Century Learning
  - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.